

SONOTRONICS

CUB-1 Manual



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CUB-1 Cellular Uplink Buoy

The CUB-1 Cellular Uplink Buoy system is designed to provide real time information about presence of an aquatic animal tagged with a Sonotronics ultrasonic transmitter. The CUB-1 accomplishes this task in conjunction with a Sonotronics SUR-1 submersible ultrasonic receiver.

Specifications:

Weight:	~35 to 45 lbs
Length:	368mm from transducer to eye bolt
Diameter:	
Current:	1.5mA when sleeping 26mAH/day idling—no text messaging 1.5A when transmitting text messages*
Battery:	Suggested: Werker WFKA-12

**The CUB consumes more current when text messages are being sent. If many are sent, it is suggested that the battery be recharged more regularly. The CUB is preprogrammed to “come on and idle” for a specific period of time depending on the project. The estimated lifetime can be calculated from the period of time each day that the cell modem is idling, combined with the amount of time spent text messaging.*

Basic Operation:

The SUR-1 submersible ultrasonic receiver is moored to the seabed below the buoy. When an animal tagged with a Sonotronics ultrasonic transmitter enters the detection zone of the SUR, it is logged to the SUR’s internal flash memory. After a certain number of preprogrammed detections, the SUR signals the CUB to activate its internal cellular modem and send a text message to a phone number. This phone number is preprogrammed into the SUR. The phone number can be changed remotely or on site by communication with the SUR. It is important to know that all CUB functions are controlled from within the SUR.

The text message sent by the SUR/CUB system is in the following format:

00: 75.0,996

This means that CUB 00 (the number of the CUB) detected a tag at 75kHz with a 996ms pulse width. This identifies a particular transmitter. Please see the SUR manual for more information on interpreting the data.

The cellular modem inside the CUB is powered by the battery inside the buoy. The SUR is powered by its internal D cell batteries. Replacement SUR batteries can be purchased from Sonotronics with the ordering code SURBAT. The werker battery (or comparable) used in the CUB can be purchased locally from a battery retailer.

The CUB has three modes: Sleeping, idling, and transmitting. When sleeping, the CUB will not receive phone calls, and it will not make phone calls. It is waiting to be

Awakened by the SUR due to an animal detection, or waiting until its internal alarm tells it to go to idle mode so that it may receive calls. When idling, the CUB is active, but not transmitting. In this state it can receive phone calls. When transmitting, the CUB is actually sending a text message.

An example of the CUB lifetime on a battery: Using the 12 amp hour battery suggested for the CUB, first you would derate the battery capacity by 10 to 20%. We can use 10 amp hours. If the CUB is idling for a one hour period every day, while transmitting for one hour every 2 weeks:

Idling: $(25\text{mA} \cdot 1 \text{ Hour} / 1 \text{ day}) = .025 \text{ amp hours per day}$

Sleeping: $(1.5\text{mA} \cdot 23 \text{ Hours} / 1 \text{ day}) = .0345 \text{ amp hours per day}$

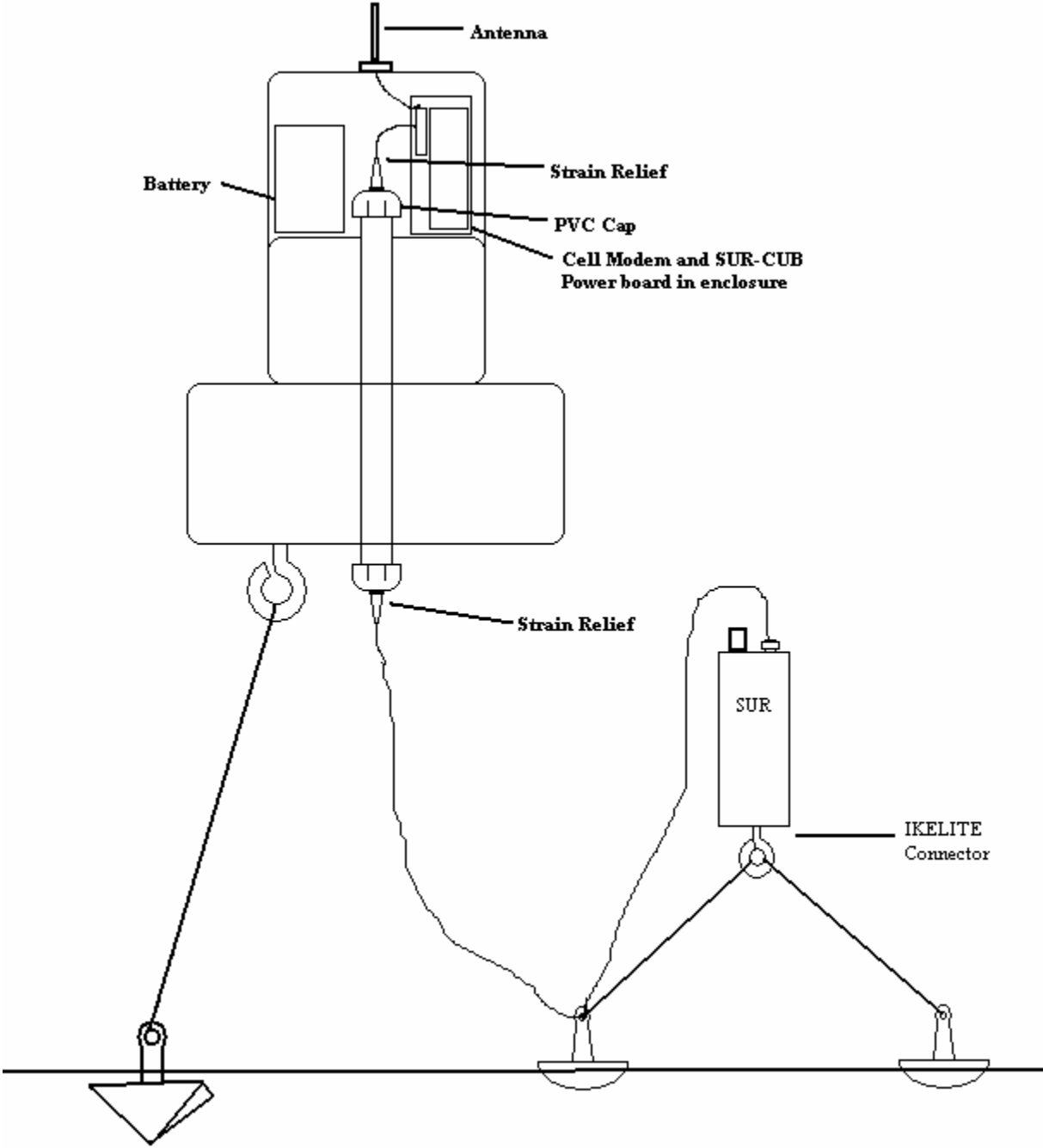
Transmitting: $(1.5\text{A} \cdot 1 \text{ Hour} / 14 \text{ days}) = .107 \text{ amp hours per day}^*$

So using a 10 amp hour battery: $10 / .107 = 93 \text{ days}$

* .071 represents 1 hour out of a 14 day period.

Deployment:

The buoy should be mounted to the seabed separately from the SUR. There should be enough slack on the cable to allow for tide fluctuations, etc. The type and strength of mooring depends upon the sea/waterway conditions where the CUB is deployed. The diagram below shows an example of how the SUR and CUB can be deployed.



Mooring for the CUB:

It is recommended that the CUB-1 buoy and the corresponding SUR be moored separately to avoid cable entanglement, and translation of acoustic noise from the Buoy to the SUR through the cabling. For the CUB, we recommend using DOR-MOR moorings for the buoy. They maximize holding power for their weight.

